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EXAMINER

MERCADO, JULIAN A

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/007,288

Applicant(s)

WOOD ET AL.

Examiner

Julian Mercado

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11-22-03, 2-17-04.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 1-58 is/are allowed.
- 6) ☐ Claim(s) 59, 62 and 65 is/are rejected.
- 7) ☐ Claim(s) 60, 61, 63, 64 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Remarks

This Office Action is responsive to applicant's amendment filed November 25, 2003 and February 17, 2004.

Drawings

The objection to the drawings under 37 CFR 1.83(a) for failing to show the instant "bond pads" and the extent to which the bond pads are "in registration" has been withdrawn in view of applicant's amendment now reciting "physical access" to the bond pads (as clarified by applicant to be solder frame metal [33]).

Claim Rejections - 35 USC § 112

The rejection of claims 49 and 55 under 35 U.S.C. 112, first paragraph, has been withdrawn in view of applicant's amendment replacing the term "registration" with --physical access--.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 65 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that

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the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 65 recites the following, "the volume of the chamber remaining relatively constant over the desired operating temperature range of the one or more devices", in lines 11-12 of the claim. The examiner has reviewed the specification for support of this feature but has not found any teaching, either literally or by way of illustration, in support thereof. The examiner additionally notes that applicant has not provided page and line citations for the newly amended limitations.

Claim Rejections - 35 USC § 102

The rejection of claims 44-55 under 35 U.S.C. 102(e) based on Harris et al. (U.S. Pat. 5,865,417) has been withdrawn in view of applicant's amendment. The examiner acquiesces with applicant's assertion that Harris et al. does not teach or at least suggest the instant invention regarding the presently amended limitation of "exposing the chamber to a negative pressure relative to atmosphere". As applicant details on page 20 of the present amendment, Harris et al. fills the cavity, i.e. chamber [10] with a working fluid [12]. As a matter of clarification, the examiner notes that this fluid is in liquid state, such as Fluorinert™ or its equivalents of alcohol, pure water, blends and combinations thereof. (col. 4 line 29-61)

New rejection

Claims 59, 62 and 65 are rejected under 35 U.S.C. 102(e) as being anticipated by Harris et al. (U.S. Pat. 5,865,417).

Regarding independent claims 59 and 65 and as discussed in a prior Office action, Harris et al. teaches a first and second wafer [20], [22] defining a chamber or sealed cavity [10], the

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first wafer having a pump-out port [12] plugged by seal [26]. (col. 6 line 4-6 and 11-19, col. 10 line 17-21, col. 11 line 18 et seq.)

As to providing one or more layers by deposition, Harris et al. teaches the following at col. 13 line 7 et seq.:

The metallization layer on top of the pyrex die 20 is used both for connectivity to the resistor 16 as well as for forming a eutectic bond to the fill hole sealing cap 26. Referring to FIG. 5, there is shown a diagram which explains the process for eutectic bonding of the silicon fill caps 26 over the fill holes 100 and 102. The resistor 16 is shown in FIG. 5 as comprised of a 50 Å titanium layer 141 formed on the underside of top die 20 covered by a 4100 Å layer of platinum 143. These two layers are partially overlapped by a 500 Å chromium or other suitable material such as titanium adhesion layer 139 which is formed on the undersurface 142 of the top die 20 and which extends up into the fill hole 102.

To this extent, the examiner also acknowledges applicant's citation of the following:

The eutectic bond is formed by placing a 25 micron thick gold-tin alloy preform washer 154 between the underside of the silicon fill cap 26 and the top metallization layer 130 surrounding the fill hole. The silicon fill cap is then placed over the fill hole, and a reflow head is then placed cold on the fill cap. A pulse of energy is then supplied to heat the reflow head, the silicon chip 26 and the metallization layers to about 350 degrees centigrade. The gold-tin preform washer then melts and the gold therein forms a gold solder with the melted gold of the facing gold layers on the underside of the silicon chip 26 and the metallization layer 130.

Applicant then submits that newly presented claim 59 "recites the step of providing one or more layer(s) by deposition to a second side of the first wafer, wherein the one or more deposited layer(s) plug the pump out port and seal the chamber". [emphasis as submitted] By this line of argument as it is emphasized, it appears to the examiner that applicant finds the eutectic or soldering of the metallization layer as not within the definition of the claimed deposition step. However, absent of further definition within the claim, this limitation is given its broadest reasonable interpretation consistent with the dictionary definition of "deposit" as "to lay down". (see, for example, Merriam Webster's Collegiate Dictionary, 10th edition) Harris et al. is

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considered to teach deposition of a layer to the second side of the wafer in that the silicon chip which is layed down, i.e. deposited as layer [26] plugs the pump-out port.

Regarding dependent claim 62, a layer of chromium (or other material) and gold function as adhesion/bonding layers on the underside of layer [26]. (col. 13 line 44-47)

As to the limitation in independent claim 65 calling for "the volume of the chamber remaining relatively constant over the desired operating temperature range of the one or more devices", notwithstanding that this limitation is not found supported by the written description for the reasons stated under 35 U.S.C. 112, first paragraph (discussion above), the volume of the chamber *as defined by the first and second wafer* [emphasis added] are asserted to remain relatively constant in that while membrane [44] may flex it is disclosed as mechanically coupled to a port [36]; the first and second wafer *per se* are not disclosed to be mechanically coupled to the membrane so as to effect the membrane volume to any measurable extent. (col. 6 line 20-33)

Allowable Subject Matter

Claims 1-58 are allowed, of which claims 1-43 are allowed for the reasons set forth in the previous Office Action.

Claims 44-58 are allowed as the prior art of record and to the examiner's knowledge do not teach or render obvious the instant invention regarding bond pad holes in the second wafer providing physical access to the bond pads on the first wafer.

Claims 60, 61, 63 and 64 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record and to the examiner's knowledge

do not teach or render obvious the claimed deposition method (evaporation, sputtering or in vacuum) as recited in claims 60, 61, 63 and 64.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Patrick Ryan
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